CS150-01 Lab 12

Selection Sort

Date Assigned: Tuesday, November 28, 2005

Date Due: Thursday, December 1, 2005

Points: 15

Problem statement

Selection sort is a very simple way of sorting an array. It is not an efficient sorting algorithm, but it is easy to conceptualize.

Let us say that you have an array of integers that needs to be sorted in ascending order. The idea behind this sorting method is that you will initially scan through all of the numbers in the array and search for the smallest number and swap it with the first element in the array. Now the first number in the array is sorted. Then you will search for the smallest element in the array starting from the second element. This number will then be swaped with the second element in the array. This will continue to execute until all of the numbers in the array are sorted from smallest to largest.

For example say the array contained the numbers 9, 5, 3, 2, 6, 4. The algorithm will search for the smallest element in the array and swap it with the first element to give you the array 2, 5, 3, 9, 6, 4. You will then search for the smallest element starting from the second one and place that in the second element location to give you 2, 3, 5, 9, 6, 4. The next search and swap will give you 2, 3, 4, 9, 6, 5. Continuing in this way will give you the final, sorted array 2, 3, 4, 5, 6, 9.

Write a program that will fill an integer array (maximum size is 256) with numbers read in from a text file called "input.dat". The numbers in the text file range from 0 - 99. As the file may contain less than 256 characters, you should keep track of the number of values read from the file. Print out the contents of the array to the screen, 10 numbers per line. Only print out the numbers read from the file.

You then need to sort the array using the selection sort algorithm described above. You should only sort the numbers read from the file. For example, if you only read 10 numbers from the file, then only sort those ten numbers and not the full array.

Your program should contain the following functions:

1. readArray: to read the numbers from the file and place them in the array.

2. printArray: to print the numbers to the screen.

3. sortArray: to sort the array in ascending order.

4. findIndexOfMin: to find the index of the smallest number in a subarray.

Your program should output

```
*************************************

*          Selection Sort          *

*************************************

Initial array is:

98   4 38 51   8   4   7 24 83   3

45   2 74

The sorted array is:

 2   3   4   4   7   8 24 38 45 51

74 83 98
```

Create a new project in Visual Studio .NET. You should name your project "12SelectionSortPUNetId", where PUNetId is your own id. I would name my project "12SelectionSortkhoj0332". While working on a project, it should be located on the current computer you are working on (i.e. the desktop). Once you have completed developing, you should copy the project folder onto Turing.

What to turn in

Once you have done this you will submit the project for grading. You submit your program by placing a copy of the project folder in the "CS150-01 Lab" folder on Turing. Make sure that you also place a copy of the project folder in your own folder on Turing.